



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Masahiro SASAGAWA et al.

Serial No. 10/549,618

Group Art Unit: 1788

Confirmation No. 8148

Filed: September 20, 2005

Examiner: CHANG, VICTOR S

For: POLYMER FOAM CONTAINING A HYDROGENATED COPOLYMER

PRE-APPEAL BRIEF CONFERENCE REQUEST

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants request review of the final Office Action in the above-identified application. No amendments are being filed with this request. This request is being filed with a Notice of Appeal. This review is requested for at least the following reasons:

I. The result effective variable arguments raised in the Office Action are inconsistent with current precedent

With respect to claim 1, this claim is rejected under 35 U.S.C. §103(a) as obvious over Holden et al. [US 3265765] (hereinafter referred to as "Holden '765") in view of Hawkins et al. [US 3935176] (hereinafter referred to as "Hawkins '176"). The Examiner cites Karande et al. (WO 02/068529) and Shibata et al. (U.S. 5,191,024) to reject various claims dependent on claim 1. However, neither of these references is cited for the features discussed below.

For the convenience of the requested Pre-Appeal Brief Conference, independent claim 1 is reprinted below.

1. A polymer foam comprising a plurality of cells defined by cell walls which constitute a polymer matrix,
said polymer matrix being comprised of:

5 to 100 parts by weight, relative to 100 parts by weight of the total of components (A) and (B), of (A) a hydrogenated copolymer obtained by hydrogenating an unhydrogenated copolymer, said unhydrogenated copolymer being a block copolymer containing at least one copolymer block S comprised of vinyl aromatic monomer units and conjugated diene monomer units and at least one homopolymer block H of vinyl aromatic monomer units, wherein said at least one copolymer block S has a vinyl bond content of from 5 % to less than 40 % as measured with respect to conjugated diene monomer units, wherein said unhydrogenated copolymer is at least one polymer selected from the group consisting of copolymers which are, respectively, represented by the following formulae (2) to (6) and (8) to (10):

- (2) S-H,
- (3) S-H-S,
- (4) (S-H)_m-X,
- (5) (S-H)_n-X-(H)_p,
- (6) H-S-H,
- (8) H-S-E,
- (9) E-S-H-S and
- (10) (E-S-H)_m-X

wherein each S independently represents a copolymer block comprised of vinyl aromatic monomer units and conjugated diene monomer units, each H independently represents a homopolymer block of vinyl aromatic monomer units, each E independently represents a homopolymer block of conjugated diene monomer units, each X independently represents a residue of a coupling agent, each m independently represents an integer of 2 or more, and each of n and p independently represents an integer of 1 or more, and

95 to 0 part by weight, relative to 100 parts by weight of the total of components (A) and (B), of (B) at least one polymer selected from the group consisting of an olefin polymer other than said hydrogenated copolymer (A) and a rubbery polymer other than said hydrogenated copolymer (A),

said hydrogenated copolymer (A) having the following characteristics (1) and (2):

(1) said hydrogenated copolymer (A) has a content of said vinyl aromatic monomer units of from more than 40 % by weight to 60 % by weight, based on the weight of said hydrogenated copolymer (A), and

(2) at least one peak of loss tangent ($\tan\delta$) is observed at -40 °C to lower than -10 °C in a dynamic viscoelastic spectrum obtained with respect to said hydrogenated copolymer (A),

said polymer foam having a specific gravity of from 0.05 to 0.5.

Claim 1 clearly requires that the at least one copolymer block S has a vinyl bond content of from 5% to less than 40% as measured with respect to conjugated diene monomer units. The Examiner addresses this feature on page 3 of the Office Action as follows:

Holden is silent about: (1) hydrogenating the elastomeric block copolymer, and the vinyl bond content of the styrene-butadiene copolymer (copolymer block S), prior to hydrogenation... However, regarding (1), Hawkins' invention relates a hydrogenated random copolymer of a conjugated diene and vinyl aromatic compound. Hawkins teaches that variations in the vinyl content of the conjugated diene portion of the unhydrogenated copolymer affect the tensile strength. There is a steady decrease in

tensile strength as vinyl content is increased. By adjustment of degree of hydrogenation (i.e. varying mole % saturation), the percent vinyl aromatic content and the vinyl content of the conjugated diene portion, a wide variety of properties in the final material may be obtained. Fig. 1 illustrates that the desired properties are obtained by adjusting the monomer ratios and vinyl bond content, i.e., these are result-effective variables for desired properties for various end uses. It would have been an obvious routine optimization to one of ordinary skill in the art to modify Holden's block copolymer according to Hawkins' teachings, i.e., hydrogenating the elastomeric block of workable amount of vinyl bond content, motivated by the desire to obtain improved properties.

The Examiner asserts that the vinyl bond content of the conjugated diene portion in the copolymer block S, and other variables "are result-effective variables for desired properties for various end uses" and that "It would have been an obvious routine optimization to one of ordinary skill in the art to modify Holden's block copolymer according to Hawkins' teachings, i.e., hydrogenating the elastomeric block of workable amount of vinyl bond content, motivated by the desire to obtain improved properties" (see page 3, lines 6-21 of the Office Action). The Applicants disagree with the Examiner.

The MPEP stipulates that "a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation" (emphasis added) (see MPEP §2144.05, II B). However, the Examiner fails to properly demonstrate that the variables referred to in Hawkins '176 are result-effective variables for achieving the effect of the present invention.

The properties desired to be achieved in Hawkins '176 are completely different from the properties desired to be achieved in the present invention. Specifically, Hawkins '176 intends to obtain a thermoplastic elastomeric material having good thermoplastic elastomeric properties, specifically, good tensile strength and good elongation set (see column 3, lines 15-25 and 44-54 and column 4, lines 5-25 of Hawkins '176). On the other hand, the present invention intends to obtain a polymer foam having excellent properties with respect to flexibility, low temperature characteristics (such as flexibility at low temperatures), shock-absorbing property (low impact resilience) and compression set resistance. For example, the present invention manipulates the vinyl bond content to impart excellent shock-absorbing property (low impact resilience) to the polymer foam (see page 32, line 4-19 of the present specification).

In summary, because Hawkins manipulates the vinyl bond content to achieve good tensile strength and good elongation set, whereas the present invention manipulates the vinyl bond content to achieve flexibility, low temperature characteristics, good shock absorbing

properties and compression set resistance, the Examiner's result effective variable argument is plainly deficient.

The desired ranges for the vinyl bond content and other variables would naturally be different between the Hawkins '176 and the present invention. Thus, the variables (such as vinyl bond content) referred to in Hawkins '176 are not result-effective variables for achieving the effect of the present invention. Attention is drawn to a paper titled "The Rise of the Result-Effective Variable" by Moshe K. Wilensky, which was submitted as "Exhibit 2" in the Applicants' response of January 29, 2010.

II. In view of applicants' previously-submitted declaration, the examiner's argument that the peak of lost tangent is an inherent property, is defective.

Independent claim 1 recites that the hydrogenated copolymer (A) has at least one peak of lost tangent ($\tan \delta$) is observed at -40°C to lower than -10°C in a dynamic viscoelastic spectrum obtained with respect to said hydrogenated copolymer (A).

On page 6 of the Office Action, the Examiner argues:

Applicants' arguments directed to Holden individually ignore the collective teachings of prior art render all the structure and composition of the claimed invention obvious, and the peak of loss tangent in feature (IV) is deemed to be inherent to the same structure and composition.

The Examiner continues this argument on page 7 of the Office Action as follows:

Since Holden teaches that the block copolymers may be used to form variety of products, including foam product, workable density and peak of loss tangent of the block copolymer are deemed to be an obvious routine optimizations to one of ordinary skill in the art, motivated by the desire to provide required cushioning properties for the same end uses as the claimed invention.

However, applicants submitted a declaration establishing that the peak of lost tangent feature is not an inherent property. More specifically, on January 29, 2010, applicants submitted as Exhibit 1, the Yahiro Declaration. The Yahiro Declaration shows that a hydrogenated copolymer meeting the other claimed features does not always have the peak of lost tangent. Further, neither Holden nor Hawkins teaches or suggests that the claimed range of the peak of loss tangent is important for achieving the effect of the present invention. Accordingly, the Examiner's inherency argument is defective.

III. Conclusion

Accordingly, applicants respectfully submit that the rejection should be withdrawn. Further, applicants respectfully request that the Office issue a finding that the application is allowed on the existing claims and that prosecution remains closed.

If there are any additional fees associated with the filing of this Request, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: May 6 2011

By: Mark J. Henry
Mark J. Henry
Registration No. 36,162

1201 New York Ave, N.W., 7th Floor
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501